

UNITED STATES PATENT OFFICE.

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STARTER.

1,282,512.

Specification of Letters Patent.

Patented Oct. 22, 1918.

Application filed September 10, 1913. Serial No. 789,041.

To all whom it may concern:

Be it known that I, JOSEPH A. WILLIAMS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Starters, of which the following is a full, clear, and exact description.

This invention relates to starters for internal combustion engines, especially engines used in connection with motor vehicles.

The main objects of the invention are to provide a starter of the spring or spring motor type, which has high efficiency, and operates in a satisfactory manner, which is durable, compact and inexpensive to manufacture, or to install on a car, and the parts of which are accessible.

The above and other objects are accomplished by my invention which may be briefly summarized as consisting in certain novel combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheets of drawings wherein I have shown the preferred embodiment of my invention, Figure 1 is a vertical sectional view through the starter constructed in accordance with my invention; Fig. 2 is a sectional view substantially along the line 2—2 of Fig. 1; Fig. 3 is a sectional view substantially along the line 3—3 of Fig. 1. Fig. 4 is a transverse sectional view through a part of the starter substantially along the line 4—4 of Fig. 1. Fig. 5 is a detail plan view of certain parts.

Referring now to the drawing, it will be seen that the starter includes a main casing 10, which is substantially ovoid in shape, and is formed from two metal stampings 10^a and 10^b, which are fastened together in the manner shown in Fig. 1, and form a casing having parallel front and rear walls, and designed to be secured to the front part of a motor vehicle in any desired manner. Extending through the casing is a starter shaft 11 which is designed to be coupled in any suitable manner to the front end of the crank shaft of the engine to be started, and which will be in alinement with said crank shaft when the casing 10, and in fact the starter as a whole is properly supported on the motor vehicle chassis.

Within this casing 10 is a spring arbor 12, formed from two sheet metal stampings

12^a and 12^b, whose outer edges are secured together, as illustrated in Fig. 1, and both of which extend laterally in concentric relationship forming a cylindrical hub or drum for the spring, and which thence extend in parallel vertical planes toward the shaft, and which finally are provided centrally with respect to the shaft 11 with hub-like portions or bearing flanges 12^c and 12^d which project in opposite directions. Into these bearing flanges are tightly driven bearing sleeves 13 constituting bearings for the starter shaft 11. The casing has secured to its opposite side walls bearing members 14 and 15, in which the central bearing portions 12^c and 12^d of the spring arbor are journaled. It will be understood that this shaft 11 may turn freely in the bearing sleeves driven into the central bearing flanges or hubs of the arbor and that the arbor has a bearing in and may turn between the shaft and the bearing members 14 and 15, carried by the casing 10.

Surrounding the drum or outer cylindrical part of the arbor is a spiral spring 16, the inner end of which is secured to the drum of the arbor in the manner shown in Fig. 2, and the outer end of which is secured to the wall of the casing 10, in the manner shown in Figs. 1 and 2. This spiral spring will have sufficient strength that when wound, it will be capable of turning the crank shaft of the engine through a sufficient number of revolutions to start the engine, under ordinary conditions.

It will be observed that when the spring unwinds to turn over or start the engine, the tension or previously stored energy of the spring is transmitted to the shaft 11, through a radius equal to the radius of the arbor drum which it may be here stated is preferably as great, or slightly greater than the crank radius of the engine, in connection with which this starter is utilized.

For the transmission of power between the spring 16 and shaft 11, I utilize a ratchet mechanism including a ratchet wheel 17, which is keyed to the shaft 11 between the two stampings of which the arbor is composed. Coöperating with the ratchet wheel are two pawls 18 which are supported beyond the periphery of the ratchet wheel, and between the stampings of the arbor on pins 19 which, as will be observed from Fig. 2, are located 180 degrees apart, and extend